NHG SYSTEMS
(NO HOLES IN GLASS)

This system eliminates the need for holes to be drilled in the glass to receive articulating bolts. The appearance is aesthetically sleek with minimal hardware.

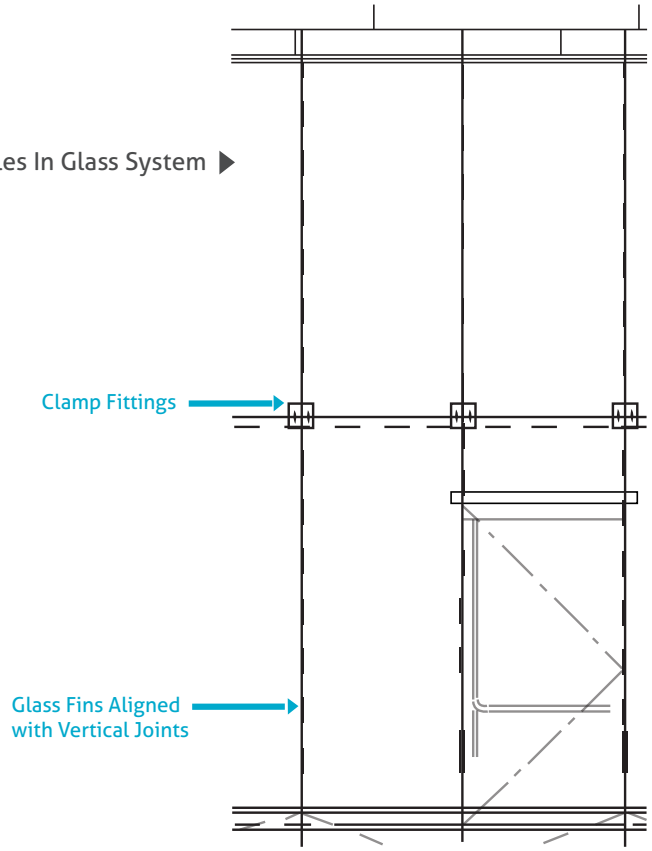
Isabel Bader Centre (Kingston, ON)

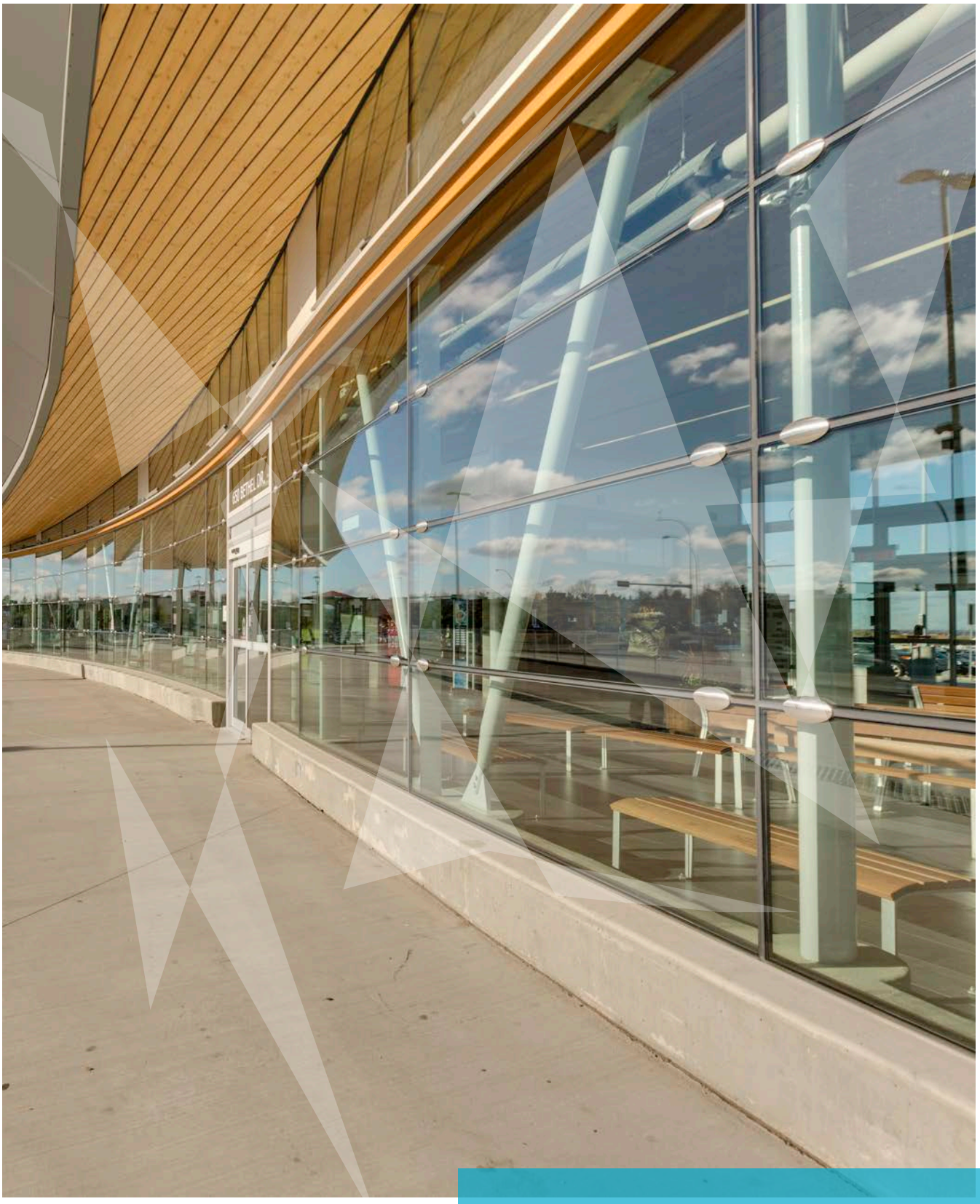
McMaster Health Campus (Hamilton, ON)

Bethel Transit Terminal (Edmonton, AB)

System Details

- Weight of glass is carried to the fins via concealed "shelf brackets".
- Fins are normally dead loaded at the base to avoid differential movements within the wall.
- Structural silicone or clamp plates resists wind loads.
- A cost effective system by removing holes in the glass.
- Suitable for monolithic or sealed glass units.
- Optimal thermal performance.





stella
Custom Glass Hardware

No Holes in Glass (NHG) Glazing Systems

Systems Overview


414
490

Bethel Transit Terminal - Edmonton, AB

Isabel Bader Centre - Kingston, ON

No Holes in Glass
Systems Overview

With the architectural desire for maximum transparency in buildings and the increasing use of double and triple glazing systems in structural glass applications, a cost effective, thermally efficient solution is the NHG Glazing System. The principle of the NHG system is to provide Ledge Brackets below each panel of glass, typically located at the bottom corners.

The weight of the glass is carried via the Ledge Bracket into the structure behind the glass (which could be glass fins, steel structure or whatever the designer has in mind) The Ledge Brackets are responsible for carrying the deadload (weight) of the glass whilst out of plane loads (such as wind loads) are transferred to the support structure by bonding the glass to the sub structure along it's vertical edges.

Because there are no holes in the glass, the exterior is completely uninterrupted!

The glass fins are constructed from tempered and laminated glass with multiple layers of glass to provide redundancy if one (or more) of the lites break simultaneously.

NHG systems can be Top Hung or Bottom Loaded

Top Hung requires the fin to be suspended from the structure above and retained in fin shoes at the sill. Provision has to be made for the face glass and the fins to move up or down to facilitate vertical movement of the structure above. Vertical stainless steel fin connector splice plates are provided at joints in the fins. These include flush mounted, high strength bolts, passing through ferrule bushings set into holes in the glass fins. The entire weight of the fins and the face glass is carried up into the structure above. Wind loads are shared more or less equally between the upper and lower structures

Interior of Bethel Transit Terminal

NHG Glazing Systems

Bottom Loaded means that each fin is retained in fin shoes top and bottom with the upper fin shoes allowing vertical movement from the connecting structure above. Vertical stainless steel fin connector splice plates are provided at joints in the fins and these include flush mounted, high strength bolts, passing through ferrule bushings set into holes in the glass fins.

The entire weight of the fins and face glass is carried down into the structure below.

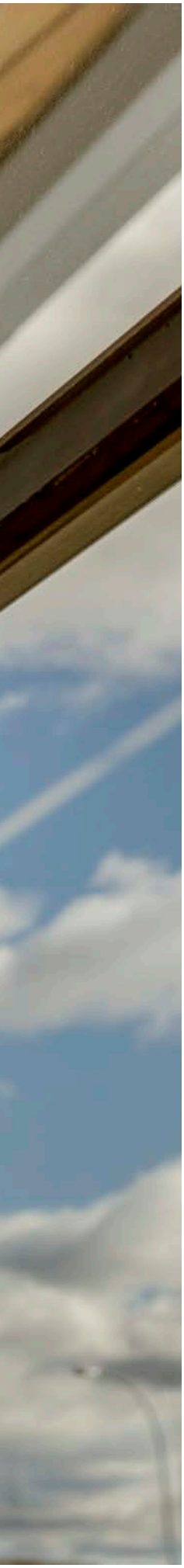
Wind loads are shared more or less equally between the upper and lower structures. Cantilevered Fins project from the structure above part and typically terminate about 2400mm [8ft] above floor level. Since the fin is fixed at the top only it is subject to significantly higher loads than full height fins. As a result they will be thicker with more lites of glass. Heavy duty brackets mount the fin to the structure above. Fin connector splice plates are generally not used or encouraged. The entire weight of the fins and face glass plus the moment loads created by wind are carried by the structure above.

Preparation of the Glass Fins

Glass fins are pre assembled in the installer's shop prior to delivery to site. This ensures accuracy and suitable ambient conditions to allow epoxy to set in a controlled environment. The fins are laid out end to end with the fin splice plates acting as templates to ensure full alignment. Epoxy is inserted into the holes in the fins to set the location of the side and splice plates extremely accurately. Once fully set, an aluminum flat bar is set into place along the leading edge of the fin and bonded to the fin using structural silicone.

Installation of the Glass Fins

Fins are transported to site and erected into the head and sill mounting shoes or brackets. They may be installed as full length fins or disassembled and re assembled in position on the site, depending on available equipment and field capabilities.



Project Hardware

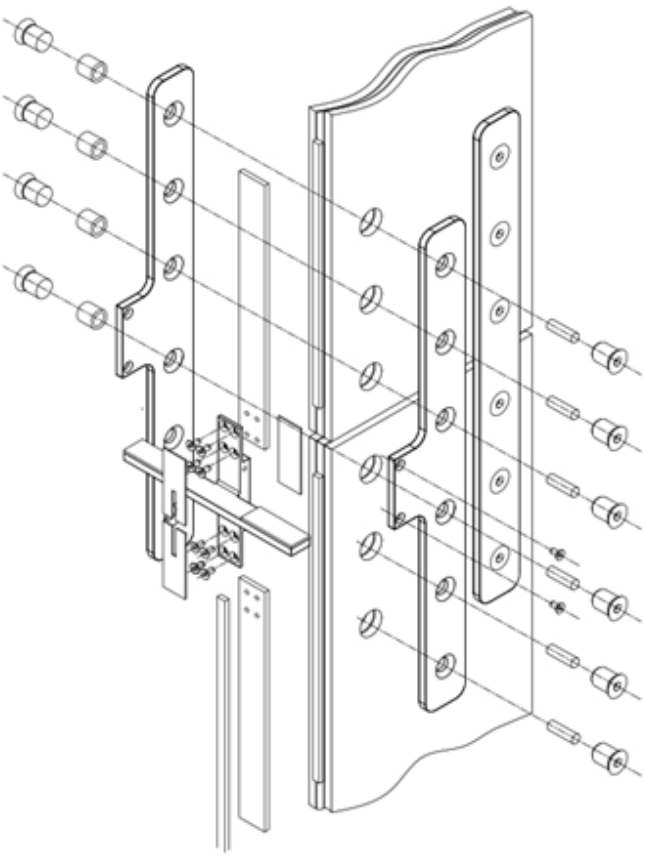
Top Hung systems usually require the installer to hang the upper portion of fin from the brackets mounted at the head and subsequent pieces of fin joined to the piece above

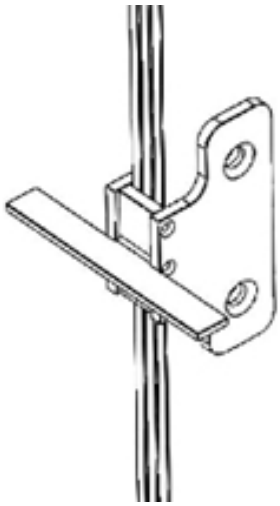
Bottom Hung systems require the lowest piece to be installed first and temporarily supported until all pieces above have been installed and bolted in place

Mounting "Ledge Brackets" to the Fins

The Ledge Brackets are made of stainless steel and mounted to the glass fins with stainless steel side plates bolted through the glass fin and retaining the Ledge Bracket in its final position.

When Ledge Brackets coincide with joints in glass fins, the side plates serve double duty acting as fin connector splice plates and to retain the Ledge Brackets in position.





Project Hardware

"The stainless steel deadload ledge brackets are integrated into the fin splice plates where they coincided at the same points. Where the ledge supports do not coincide, smaller, more discreet fittings are provided and bolted directly to the fin."

Face Glass Layout

The vertical joints in the glass are usually retained at the typical width of 10mm whilst the horizontal joint width is increased to 19mm to facilitate the thickness of the Ledge Bracket, setting blocks and a nominal tolerance of about 3mm between the underside of the Ledge Bracket and the top of the glass panel below.

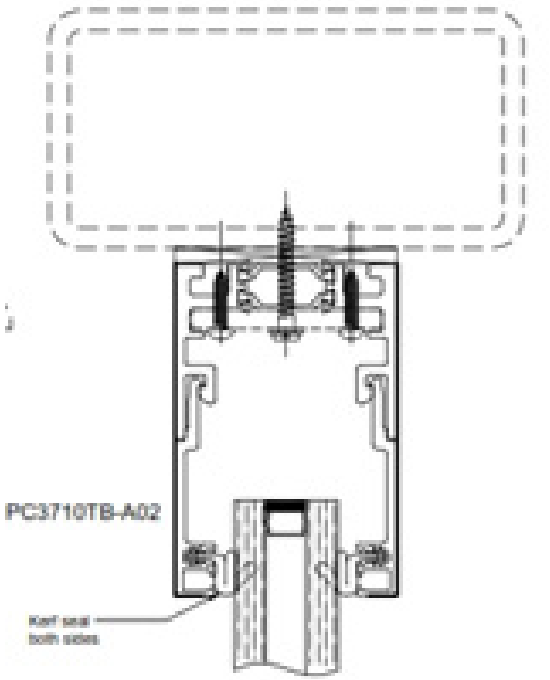
Glass fabrication tolerances need to be significantly tighter than traditionally advertised.

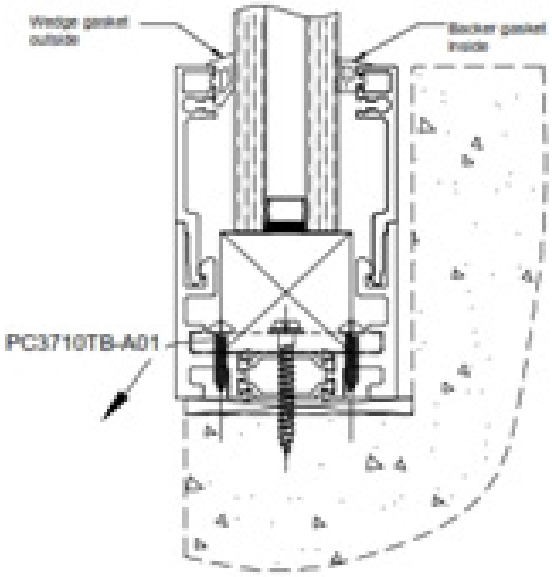
Installation of the face glass is usually carried out from the bottom rows, upwards although this is not specifically required. As each panel is installed against Norton glazing tape, temporary "Dutchman clips" are fastened through the vertical joint, into the aluminum flat bar mounted to the fin.

Structural silicone is then applied between the inside of the face glass and the aluminum flat bars bonded to the glass fins. Once cured the "Dutchman clips" are removed and the butt joints between the panels of glass sealed for weather resistance.

Perimeter Channels

A custom designed perimeter channel, suitable for thermally and non-thermally broken conditions is provided to the head, sills and jambs to retain the glass and to facilitate ease of installation using site applied glazing clips and dry wedge type gaskets. In addition to providing an effective seal, this system also allows for deflection of the structure and ease of replacement in the future. Each Perimeter Channel system is designed to meet the specific requirements of the project.





McMaster Health Campus - Hamilton, ON

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